

REMARKS

Responsive to the outstanding Office Action, applicant has carefully studied the Examiner's rejections. Favorable reconsideration of the application in light of the following arguments is respectfully requested.

Claims 1-9 are pending in the application. In the response claims 1 and 7 have been amended. It is respectfully submitted that no new matter was added in making these changes.

REJECTIONS UNDER 35 USC 102

Claims 1-4 and 7-9 were again rejected under 35 USC 102 as being anticipated by Taggart. The Examiner stated that Taggart teaches a method for producing a three dimensional preform having a final target shape from textile starting materials wherein 2 dimensional bonded fabric is formed by laying textile materials two dimensionally to form a stack which is subsequently subjected to heated rollers in order to bond the stack together into a two-dimensionally bonded fabric. The subsequent bonded fabric is subjected to shaping or draping to form the bonded three dimensional target shape.

The present invention, as defined in independent claim 1, defines a method for producing a three dimensional preform, wherein complex three-dimensional geometries, an optimal fiber orientation and a high deposit rate can be achieved.

The present invention, as defined in claim 1, includes the steps of:

a) determining the fiber orientation and the geometry in a two-dimensional bonded fabric by back-calculation from the final three-dimensional target shape,

b) laying out the textile starting material to manufacture a two-dimensional fabric such that in the two-dimensional fabric the orientation of the fibers in the two-dimensional fabric are as back-calculated from the three-dimensional target shape, and

c) producing the three-dimensional target shape by at least one of shaping or draping the two-dimensional fabric, and the textile starting material is not yet definitely fixed in position.

With regard to the prior art, Taggart et al. describe a process for manufacturing advanced composite structures. Taggart teaches that in a first step a laminate is made including different plies, in each of which the fibers are unidirectional. After a step of cutting the laminate, the laminate is heated and molded using a stamping press.

Claim 1 has been amended herein to include the feature that the textile starting material of the two-dimensional fabric is not yet definitely fixed in position during step c). Support for this feature can be found, at least, in paragraph [0014]. Claim 7 has been amended to conform to amended claim 1 by canceling the variants that the textile starting material is fixed by the introduction of a binder before or during the chosen shaping or draping process (step c).

The applicant agrees to the Examiner's argumentation concerning the term "two-dimensional fabric" and accepts, that a multilayered fabric can be understood as two-dimensional fabric.

It is the object of the present invention, to provide a method for producing especially three-dimensional fiber-reinforced components having complex three-dimensional geometries (see description: [0012]). This is enabled by the additional feature of amended claim 1, according to which the fibers, fiber bundles or tapes in the

two-dimensional fabric of the preform are not yet or not yet completely fixed in position during the process of shaping and draping (step c) .

Taggart et al. describes that different plies are compressed by a series of heated consolidation rollers to laminate said plies. After said lamination step, which results in a two-dimensional fabric, the initial material building the different plies is fixed during a following step of shaping the multi-layered fabric. The feature of textile starting material not being fixed when draping or shaping two-dimensional fabric is respectfully submitted to not be disclosed by Taggart et al.

In view of the above claim 1, and the claims dependent therefrom, are believed to be allowable over 35 USC 102. Withdrawal of this rejection is therefore respectfully submitted.

REJECTIONS UNDER 35 USC 102/103

Claims 5 and 6 were rejected under 35 USC 103 as being unpatentable over Taggart as described above.

Claims 5 and 6 depend directly or indirectly from what is believed to be an allowable claim 1, as described above, and are therefore believed to be allowable based, at least, on this dependence.

Claims 1-9 were rejected under 35 USC 103 as being unpatentable over Taggart and further in view of either one of Wang or Williamson and further in view of any of Cogburn, Cavallaro and Marshall.

Wang et al. describe the simulation of the two-dimensional design of single plies of an airfoil. Williamson et al. describe how to back-calculate the two-dimensional

pattern of a surface of a three-dimensional body. Both documents were cited in the alternative to give examples for back-calculation of two-dimensional plies from three-dimensional bodies. Neither Wang nor Williamson describe the process of shaping and draping a two-dimensional fabric in order to build a three-dimensional preform and further do not give any hint on the feature that the fibers of a two-dimensional fabric to be shaped or draped in order to build a three-dimensional preform are still at least partially movable with respect to each other with said two-dimensional fabric.

Cogburn et al. describe that the fibers are fixed in tapes connected to each other to form a two-dimensional ply, which is to be folded in order to produce a final three-dimensional component. Both the fibers within the tapes and the tapes themselves are fixed with respect to their adjacent fibers or tapes. Similarly, Marshall et al. propose fixing single fibers within plies, the plies being positioned adjacent to each other. Neither

Neither Cogburn et al. nor Marshall et al. propose forming bodies having complex three-dimensional geometries and do not give any hint on the feature of preparing a two-dimensional fabric, the textile starting material of which is not yet or not yet definitely fixed in position during shaping and draping said two-dimensional fabric.

Similarly, Cavallaro et al., which was the third document the Examiner cited in the alternative, propose a hockey stick containing a plurality of fiber plies, wherein the fibers are fixed within a ply. During preparation of a three-dimensional hockey stick, the connection points between the fibers are not movable and therefore the additional feature of new claim 1 is not obvious from Cavallaro et al.

In view of the above, it is respectfully submitted that no reasonable combination of Taggart and either one of Wang or Williamson and any one of Cogburn, Cavallaro and Marshall yield the invention as described in claim 1 herein.

The remaining claims 2-9 depend from claim 1 and are believed allowable based, at least, upon this dependence.

In view of the above, reconsideration and withdrawal of the rejections under 35 USC 103 is respectfully requested.

Summary

As noted above claim 1, and the claims dependent therefrom, are believed to be allowable over the applied art of record. In view of the above, it is submitted that the application is in condition for allowance, and action towards that end is respectfully requested. Should the Examiner wish to modify the application in any way, applicant's attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,

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